

## Claims

- [c1] What is claimed is:
1. A wireless RF module for an MRI apparatus, the wireless RF coil module comprising:  
a modulator configured to modulate a carrier signal with an MR signal in an RF coil of the MRI apparatus;  
a transmitter configured to transmit the modulated signal; and  
a receiver wirelessly connected to the transmitter and configured to receive the modulated signal for subsequent data processing and image reconstruction.
  - [c2] 2. The module of claim 1 wherein the modulator is further configured to amplitude modulate the carrier signal.
  - [c3] 3. The module of claim 1 wherein the carrier signal has a frequency between approximately  $300 \text{ MHz}$  to approximately  $3 \text{ GHz}$ .
  - [c4] 4. The module of claim 1 wherein the receiver is located remotely from the MRI apparatus.
  - [c5] 5. The module of claim 1 wherein the receiver includes an electric dipole antenna.
  - [c6] 6. The module of claim 1 wherein the transmitter is further configured to transmit the modulated signal out of a bore defined by a magnet assembly of the MRI apparatus.
  - [c7] 7. The module of claim 1 incorporated into a kit and configured to retrofit an existing MRI apparatus to wirelessly transmit the MR signal from a receive coil of the MRI apparatus to a receiver configured input the received MR signal to a data processor for processing and image reconstruction.
  - [c8] 8. An MRI apparatus comprising:  
an MRI system having a number of gradient coils positioned about a bore of a magnet to impress a polarizing magnetic field;  
an RF transceiver system; and  
an RF coil assembly configured to wirelessly transmit an MR signal to the RF

transceiver system.

- [c9] 9. The MRI apparatus of claim 8 wherein the RF coil assembly includes an RF modulator configured to modulate a UHF carrier frequency with the MR signal.
- [c10] 10. The MRI apparatus of claim 9 wherein the RF modulator is further configured to amplitude modulate the UHF carrier frequency with the MR signal.
- [c11] 11. The MRI apparatus of claim 8 wherein the RF coil assembly further comprises a transmitter configured to wirelessly transmit the MR signal out of the bore of the magnet.
- [c12] 12. The MRI apparatus of claim 11 wherein the RF coil assembly further comprises a receiver wirelessly connected to the transmitter and configured to receive the modulated signal transmitted by the transmitter.
- [c13] 13. The MRI apparatus of claim 12 further comprising an electric dipole antenna attached to the receiver.
- [c14] 14. The MRI apparatus of claim 12 wherein the receiver is positioned at an end of the bore from the MRI system.
- [c15] 15. The MRI apparatus of claim 11 further comprising a rechargeable battery configured to provide power to the RF modulator and the transmitter.
- [c16] 16. The MRI apparatus of claim 8 wherein the RF coil assembly further comprises a pre-amplifier, a local oscillator, and a 900 MHz<sub>Z</sub> transmitter.
- [c17] 17. An MRI system comprising:  
means for positioning a subject to be scanned within a bore of a magnet assembly for MR data acquisition;  
means for impressing a polarizing magnetic about the bore of the magnet;  
means for exciting nuclei in the subject;  
means for sensing signals resulting from the exciting nuclei in the subject;  
means for wirelessly transmitting the signals to a receiver means; and  
means for reconstructing at least one image of the subject from the signals received by the receiver means.

- [c18] 18. The MRI system of claim 17 wherein the receiver means includes means for wirelessly receiving the signals transmitted by the means for wirelessly transmitting.
- [c19] 19. The MRI system of claim 17 further comprising means for acquiring power for components of the MRI system from a B field associated with an RF transmit pulse sequence from the means for exciting nuclei in the subject.
- [c20] 20. The MRI system of claim 19 further comprising means for rectifying induced voltage generated during excitation of nuclei in the subject.
- [c21] 21. The MRI system of claim 20 further comprising at least one battery and means for charging the at least one battery from the induced voltage.
- [c22] 22. The MRI system of claim 17 further comprising means for improving SNR.